GAYDUK, Vladimir Nikitovich [Haiduk, V.M.]; SAGACH, Mikhail Fedorovich [Sahach, M.F.]; SEMENKO, M.V., red.; CHEREVATSKIY, S.A. [Cherevats'kyi, S.A.], tekhn. red.

[Thermoelectric systems in agriculture] Elektroteplovi sil's'kohospodars'ki ustanovky. Kyiv, Derzh. vyd-vo sil's'kohospodars'koi lit-ry URSR, 1961. 138 p. (MIRA 15:3)
(Electricity in agriculture)

LUTSEVICH, P.A.; MONGALEV, G.F.; MIKHALEVICH, N.G.; ZINOVICH, K.F.; SAFRONENKO, A.P.; KLIMENKOV, P.A.; GAYDUKEVICH, N.M.; SILIN, M.S.; BRAZOVSKIY, P.V.; KOVPAK, M.D.; MELESHKEVICH, O.A.; KAMENTSEVA, V.N.; KULIKOVSKIY, A.V.; TARAYKOVICH, P.I.; ALEYNIKOV, G.A.; SHMULEVICH, Sh.S.;GRACHEVA, K.I.; NIKOLAYEVA, Yu.N.; VOLOKHOV, M.A.; DOMASHEVICH, O., red.; KARKLINA, E., red.; ZUYKOVA, V., tekhn. red.

[Manual for livestock raisers] Spravochnik zhivotnovoda. 2., dop. i perer. izd. Minsk, Gos.izd-vo sel'khoz.lit-ry BSSR, 1963. 462 p. (MIRA 16:8)

1. Glavnyy zootekhnik Upravleniya nauki Ministerstva sel'skogo khozyaystva Belorusskoy SSR (for Safronenko).
(Stock and stockbreeding)

GAYDUKOV, Yu. P. Cand Phys-Math Sci -- (diss) "Galvanomagnetic properties of gold." Mos, 1959. 10 pp (Acad Sci USSR. Inst of Phys Problems), 200 copies. Bibliography at end of text (23 titles) (KL, 46-59, 143)

KAMAYEV, M.F., prof.; GAYDUK, Yu.T.

Reduction capacity of blood serum in malignant tumors and other surgical diseases. Vrach.delo no.7:701-705 Jl '58 (MIRA 11:9)

1. Kafedra fakul'tetskoy khirurgii (zav. - prof.M.F. Kamayev) Dnepropetrovskogo meditsinskogo instituta.
(REDUCTION, CHEMICAL)
(BLOOD--ANALYSIS AND CHEMISTRY)

KOZYREV, G.S., dots.; GAYDUKASOVA, V.N.

Differences in the mobility of leg joints in different domestic duck breeds. Uch.zap. KHGU 52:265-269 '54. (MIRA 11:11)

1. Kafedra zoologii pozvonochnykh Khar'kovskogo gosudarstvennogo universiteta (zav. kafedroy prof. I.B. V[illegible]lchanetskiy).
(Duck breeds) (Joints) (Extremities (Anatomy))

GAYDUKEVICH, I.

Procedure for the acquisition of agricultural machinery by collective farms. Vop. ekon. no.3:74-77 Mr '58. (MIRA 11:4)
(Collective farms) (Machine-tractor stations)

GAYDUKEVICH, L.I.

GAYDUKEVICH, L.I.: "Accelerated development of seed meadows on newly cultivated dry land". Moscow, 1955. All-Union Sci Res Inst of Fodder Imeni V.R. Vil'yams.

SO: Knizhnaya Letopis' No. 49, 3 December 1955. Moscow

GAYDUKEVICH, L. I. Cand Agr Sci -- (diss) "The accelerated creation of seeded meadows on newly reclaimed waterless lands." Voronezh, 1957. 18 pp (Min of Agriculture USSR. Voronezh Agr Inst), 100 copies (KL, 4-58, 84)

GAYDUKEVICH, L.

USSR/Meadow Science.

Abs Jour : Ref Zhur - Biol., No 4, 1958, 15448

Author : L.I. Gaydukevich

Inst : The All-Union Scientific Institute for Foodstuffs

Title : The Making of Meadows in Waterless Valley Plains. (Zaluzheniye sukhodol'nykh lugov).

Orig Pub : Zemledeliye, 1957, No 4, 84-86

Abstract : The All-Union Scientific Institute for Foodstuffs conducted research in the course of 1952-1955 on the acceleration of renewal of degenerated meadows. The productivity of the natural meadow selected for testing was poor. One was not able to get more than 6 centners per hectare of very low quality dry matter form the very best lots. The best results after replowing and fertilizing the natural meadow was obtained from meadow making

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USSR/Meadow Science. L.

Abs Jour : Ref Zhur - Biol., No 4, 1958, 15448

under the crust during the springtime (about 89 centners per hectare and 758 kilograms of digestible albumin per 1 hectare). The making of crustless meadows in the summer on black and lupine fallow land turned out less effective.

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GAYDUKEVICH, Leonid Innokent'yevich; ZOTOVA, L.A., red.

[Nutrition of legumes] Pitanie bobovykh. Moskva, Izd-vo "Znanie," 1965. 31 p. (Novoe v zhizni, nauke, tekhnike. V Seriia; Sel'skoe khozizistvo, no.1)
(MIRA 18:1)

GAYDUKEVICH, V.

Simplifying accounting for products and materials on state farms.
Bukhg.uchet 15 no.9:16-21 S '56. (MLRA 9:11)
(State farms--Accounting)

GAYDUKEVICH, V.

GAYDUKEVICH, V.

Regulation for the calculation of stockbreeding production on state farms. Bukhg.uchet. 14 [i.e. 16] no.8:17-23 Ag '57. (MLRA 10:8)

(Stock and stockbreeding--Accounting)

S/056/61/041/002/005/028
B102/B205

24.7000

AUTHORS: Alekseyevskiy, N. Ye., Gaydukhov, Yu. P.

TITLE: The Fermi surface of lead

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. 2 (8), 1961, 354 - 362

TEXT: An attempt was made to determine the topology of the Fermi surface of lead. Lead was chosen since the de Haas - van Alphen effect has been studied most thoroughly for this metal. This makes it possible to compare the results of two different methods of investigating the Fermi surface. Rod-shaped lead single crystals grown by the method of Chokhral'skiy and plates cut out of single crystals grown by the Obreimov-Shubnikov method were used as specimens. Measurements of resistivity at room and helium temperatures yielded $\rho_{300}/\rho_{4.2}$ = 6000 - 10,000. The measurements themselves were made at 4.2°K in a potentiometer circuit with a sensitivity of 10^{-9} v. The angular dependence of resistivity and of the

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S/056/61/041/002/005/028
B102/B205

The Fermi surface...

Hall emf was measured in a 23-koe field. The magnetic field was rotated in a plane perpendicular to the axis of the specimen. The Hall emf was measured both in plates and in round specimens. The results obtained are graphically represented. Fig.1 illustrates some characteristic cases of the angular dependence of resistivity $\rho_H(\vartheta)$, where ϑ is the angle of rotation of the magnetic field. A quadratic increase of resistivity in the magnetic field could be observed within a wide range of angles, whereas saturation was found only under certain conditions, e.g., for $\vec{H} \parallel [110]$ and $\vec{H} \parallel [112]$ with $\vec{I} \parallel [011]$. The $\rho_H(\vartheta)$ diagram shows narrow, deep minima in these field directions. The type of Fermi surface can be determined from the stereographic projection of the singular directions of the magnetic field. It is a "spatial network of corrugated cylinders", the axes of which are parallel to the direction [111]. This is one of the simplest types which a metal with a cubic lattice can have. An estimate of the diameter of the "cylinders" yields $(0.18 \pm 0.03)b$, where b is the period of the reciprocal lattice in the [001] direction; $b = 2(2\pi/a)$, $a = 4.94$ Å. The mean diameter d_c of the "corrugated cylinders", which form the open Fermi surface of lead,

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The Fermi surface...

can also be estimated from the Hall constant R in the [110] direction. This is done with the use of formulas obtained by I. M. Lifshits and V. G. Peschanskiy (ZhETF, 35, 1951, 1958). One finds $d_c \approx 0.16$ b, from which the volumes of the open surface (0.11 b^3) and of the closed surface (spheres of radius $r \approx 0.3$ b) can be calculated. The Fermi surface in the ($\bar{1}10$) plane is schematically shown in Fig.6. The results presented here are compared with those obtained by A. V. Gold from the de Haas - van Alphen effect. Gold found three groups of oscillation periods of susceptibility (α, β, γ). The α-type oscillations may be related to the closed "perforated" Fermi surface (short-period oscillations, insignificant anisotropy of the period in all H-directions). The beta and gamma oscillations correspond to the maximum and minimum cross sections of the open Fermi surface (β - weak anisotropy, γ - strong anisotropy). Academician P. L. Kapitsa is thanked for his interest in the work. There are 7 figures, 1 table, and 10 references: 5 Soviet and 5 non-Soviet. The three most important references to English-language publications read as follows: J. R. Klauder, J. E. Kunzler. Phys. Chem. Solids, 18, 256, 1961; A. V. Gold. Phil. Trans. Roy. Soc., 251, 85, 1958; W. A. Harrison. Phys. Rev. 118, 1190, 1960.

Card 3/4

S/056/61/041/002/005/028
B102/B205

The Fermi surface...

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR (Institute of Physical Problems of the Academy of Sciences USSR)

SUBMITTED: March 22, 1961

Card 4/4

MIL'SKIY, O.V. [Mil's'kyi, O.V.]; GAYDUKHOVICH, Kh.Ya. [Haidukhovych, Kh.IA.]; SHLESTOVA, S.V.

Use of the refractometric method for determining fat content of ginerbread and semiprocessed products for pastry and cake manufacture. Khar.prom. no.2:76-80 Ap-Je '62. (MIRA 15:9)

1. Ukrainskiy nauchno-issledovatel'skiy institut pishchevoy promyshlennosti.

(Baked products--Testing)
(Refractometer)

MIL'SKIY, O.V. [Mil's'kyi, O.V.]; GAYDUKHOVICH, Kh.Ya. [Haidukhovych, Kh.IA.]; SHELESTOVA, S.V.

Refractometric method for determining sugar content of gingerbread. Kharch.prom. no.4:50-53 O-D '63. (MIRA 17:1)

GAYDUKOV, A.A.

KORCHEMKIN, B.M.; RAPOPORT, Yu.O.; GAYDUKOV, A.A.

Pneumatic transportation of molding sand. Lit. proizv. no.2:12-13 F '58. (MIRA 11:3)

(Sand, Foundry) (Pneumatic-tube transportation)

GAYDUKOV, A. Kh., Cand of Vet Sci — (diss) "Study of the virulent properties of the pathogens of piroplasmosis of dogs (Piroplasma canis Piana et Galli — Valerio, 1895)." Leningrad, 1957, 7 pp, (Leningrad Veterinary Institute) 100 copies (KL, 29-57, 92)

COUNTRY : USSR
CATEGORY :

ABS. JOUR. : RZBiol., No. 3 1959, No. 10284

AUTHOR : Kolabskiy, N. A., Gaydukov, A. Kh.
INST. : Leningrad Veterinary Institute
TITLE : Experiments on the Attenuation of Virulent Properties of the Pathogens of Equine Nuttalliosis

ORIG. PUB. : Sb. rabot Leningr. vet. in-t, 1957, No 16, 80-83

ABSTRACT : When colts were infected with the blood of horses containing Nuttallia equi 27-38 days after its first passage it was impossible to produce the disease in the colts which had recovered from the injection of nuttallias which had been passaged 3 times. The same results were obtained in colts after the injection of blood containing these parasites which had been passaged 4, 5, and 7 times. The pathogen of equine nuttalliosis when passaged through the bodies of susceptible

CARD: 1/2

Country :
CATEGORY :

ABS. JOUR. : RZBiol., No. 1959, No. 10284

AUTHOR :
[illegible] :
[illegible] :

ORIG. PUB. :

ABSTRACT : animals produces a serious disease after 96 hours when it has been passaged once, twice and 3 times, but does not cause any disease in the 4th, 5th and 7th passages. -- S. G. Vasina

CARD: 2/2

USSR / Diseases in Animals. Diseases Caused by Protozoa R

Abs Jour: Ref Zhur-Biologiya, No 16, 1958, 74234

Author : Smirnov. A. M.; Chizh, A. N.; Gaydukov, A. Kh.

Inst : Leningrad Veterinary Institute

Title : Test of the Natural Gastric Juice of Horses for Coccidiosis in Young Chicks and Rabbits

Orig Pub: Sb. rabot Leningr. vet. in-t, 1957, vyp. 16, 92-96

Abstract: It is shown that the natural gastric juice (NGJ) of horses given to young chicks for several days in the form of a drink for 20 to 30 minutes before feeding gives a positive result during treatment of coccidiosis. The appetite of the young chicks is increased; general condition and liveliness is improved. Deaths cease. A test of the comparative

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ZHDANOV, M.M.; KOSTRYUKOV, G.V.; ASFANDIYAROV, Kh.A.; MAKSUTOV, R.A.; KONDAKOV, A.N.; TURUSOV, V.M.; SILIN, V.A.; PILYUTSKIY, O.V.; SHELDYBAYEV, B.F.; PETROV, A.A.; SMIRNOV, Yu.S.; KOLESNIKOV, A.Ye.; DROZDOV, I.P.; IVANTSOV, O.M.; TSYGANOV, B.Ya.; KORNONOGOV, A.P.; VDOVIN, K.I.; ALEKSEYEV, L.A.; GAYDUKOV, D.T.; LIP[redacted]SKIY, A.Ya.; DANYUSHEVSKIY, V.S.; VEDISHCHEV, I.A.; ALEKSEYEV, L.G.; KRASYUK, A.D.; IVANOV, G.A.

Author's communications. Neft. i gaz. prom. no.2:67-68 Ap-Je '64. (MIRA 17:9)

BUTSIY, A.I., inzh.; GAYDUKOV, E.E., inzh.

Effective means of lowering the oversize yield in limestone quarries. Stroi. mat. 9 no.10:14-17 O '63. (MIRA 16:11)

GAYDUKOV, G.F., Cand Agr Sci (diss) "Formation of corn yield in relation to feeding ~~in relation~~ areas of ~~fertilization nutrition~~ and regimen of soil moisture. (Under conditions of the southern part of Stalingradskaya Oblast)." Stalingrad, 1959. 21 pp (Min of Agr RSFSR. Stalin Agr Inst), 200 copies (KL,27-59,121)

-46-

GAYDUKOV, Georgiy Fedorovich, kand. sel'khoz. nauk; KUKLIN, P.V., red.; IZHBOLDINA, S.I., tekhn. red.

[Corn, the most inexpensive forage] Kukuruza - samyi deshevyi korm. Stalingrad, Stalingradskoe knizhnoe izd-vo, 1960. 11 p. (MIRA 14:12)

(Corn (Maize))

GAYDUKOV, Georgiy Fedorovich; KUKLIN, P.V., red.; IZHBOLDINA, S.I., tekhn.red.

[What we gain from irrigating corn fields] Chto daet oroshenie kukuruzy. Stalingrad, Stalingradskoe knizhnoe izd-vo, 1960. 22 p. (MIRA 14:2)
(Stalingrad Province--Corn (Maize)) (Irrigation farming)

[redacted], G.K., tekhnik-elektrik.

Organizing the repair of electric equipment. Prom. energ. 12 no.5: 38 My '57. (MLRA 10:6)
(Electric apparatus and appliances--Maintenance and repair)

MOSKALENKO, S.I.; GABOVICH, M.S.; BACHINSKIY, Yu.V.; TOMILIN, A.V.; MEDVEDEV, P.M.; LOMANOVA, M.M.; GOLOVKOV, P.D.; GAYDUKOV, G.I.; ALEYNIKOV, V.V.; STENIN, N.D.; MIRONOVA, V.V.; BELAVINTSEVA, Ye.S.; TSVETSINSKIY, S.V.; NECHKURNYY, P.; KOBZAR', N.K.; ROZHNOVA, Ye.S.; PELETMINSKIY, V.N.; GORDEYCHUK, V.K.; SHMYRIGO, V.F.; KISLYUK, N.

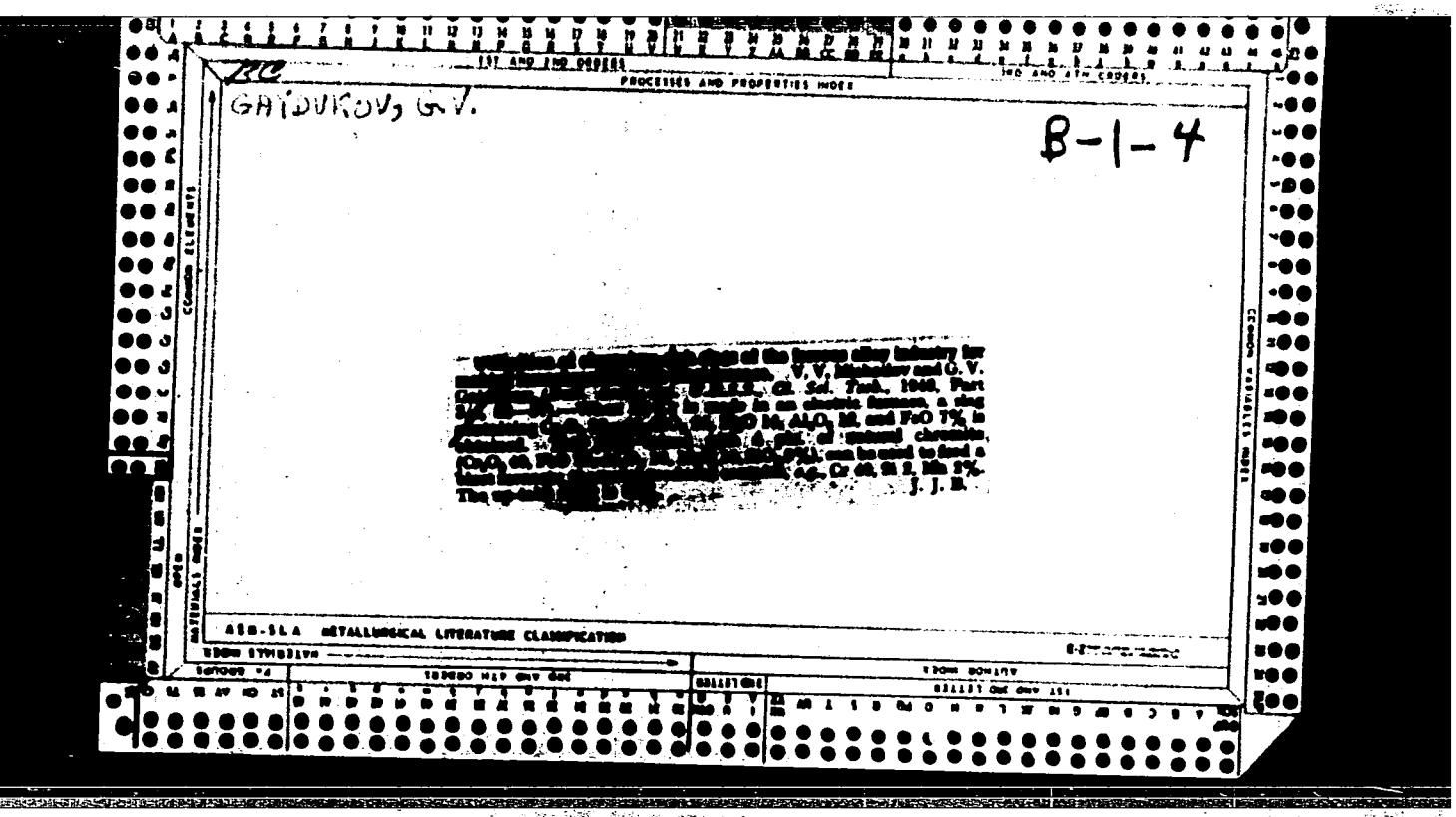
Fifty years in the sugar industry. Sakh.prom. 33 no.2:18 F '59. (MIRA 12:3)

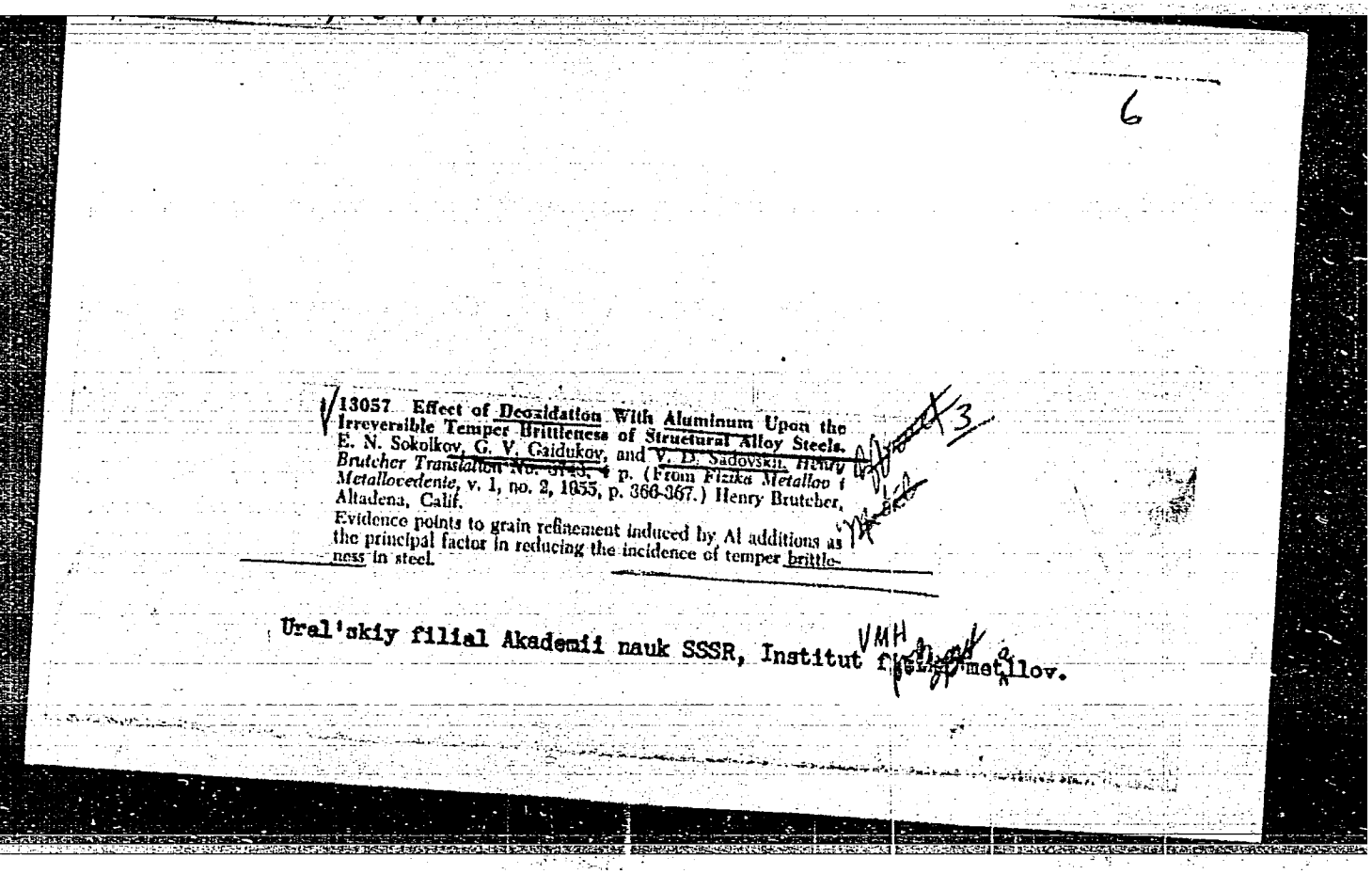
(Shtepan, Georgii Viacheslavovich, 1888-)

GAYDUKOV, G. K.

Limit equilibrium design of shallow shell panels.

report presented at the Symposium on Non-Classical Shell Problems, Warsaw, 2-5 Sept 1963.





6

13057 Effect of Deoxidation With Aluminum Upon the Irreversible Temper Brittleness of Structural Alloy Steels. E. N. Sokolkov, G. V. Gaidukov, and V. D. Sadovskii. *Henry Brutcher Translation No. 3143*, 4 p. (From *Fizika Metallov i Metallovedenie*, v. 1, no. 2, 1955, p. 366-367.) Henry Brutcher, Altadena, Calif.

Evidence points to grain refinement induced by Al additions as the principal factor in reducing the incidence of temper brittleness in steel.

Ural'skiy filial Akademii nauk SSSR, Institut fiziki metallov.

GAYDUKOV, G.V.

Effect of aluminum deoxidation in tempering on the irreversible temper brittleness of structural steel alloys. E. N. Sokolkov, G. V. Gaidukov, and V. D. Sadovskii. *Trudy Inst. Fiz. Metal., Akad. Nauk S.S.S.R., Ural. Filial* 1956, No. 18, 30–6; cf. preceding abstr.—Alloys of 30KhN4 (with out Al and with 0.02–0.16% Al were prepd. in open magnesite crucibles. Specimens 10 × 10 × 55 mm. were oil-quenched from 1100°, tempered for 1 hr. at temps., *t*, from 200 to 500° in 50° intervals, quenched in water, and notched for tensile tests. The curves of the impact strength a_k vs. *t* of the alloy without Al and with only 0.02% Al varied very little: a pronounced min. at 350° followed by a sharp rise and a shallow min. at 500°, indicating the presence of both irreversible and reversible brittleness. The fracture at the brittleness range was coarse-grained. The a_k vs. *t* curves of the alloys with 0.05 and 0.16% Al exhibited only a slight min. at 350°, and the fracture showed an increased amt. of fine-grained austenite. To det. whether the effect of Al, reducing the irreversible brittleness, was due to the formation of Al nitride, thus preventing the formation of Cr and Mn nitrides (cf. Schrader, *et al.*, *C.A.* 44, 4309*f*) or to the increase of fine-grained structure (cf. Houdremont and Schrader, *C.A.* 33, 3733[8]) alloys contg. 0.03 and 0.15% Al were prepd. *in vacuo* (0.05–1 mm. Hg). The excess of Al secured the absence of N and 0.03% of Al was not enough to affect a_k. The a_k vs. *t* curves of both alloys were practically identical, passing through a sharp min. at 350° and a shallower one at a higher level at 500°. No effect on the grain structure was noted. Conclusion: the effect of Al on a_k was due to the increase of the fine structure rather than to the prevention of Cr and Mn nitride formation.

I. B.

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1-4E2c

VOLKOVA, N.M.; GAYDUKOV, G.V.

Process of the aluminum reduction of potassium fluotitanate.
Izv.Sib.otd.AN SSSR no.4:43-51 '59. (MIRA 12:10)

1. Ural'skiy filial Akademii nauk SSSR.
(Potassium fluotitanate) (Aluminum)

VOLKOVA, N.M.; GAYDUKOV, G.V.

Some thermodynamic data on potassium fluotitanate.
Izv. Sib. otd. AN SSSR no.6:70-77 '59. (MIRA 12:12)

1.Ural'skiy filial AN SSSR.
(Potassium fluotitanate--Thermal properties)

18 3100 1087, 1208, 1454

S/200/61/000/002/001/001
D229/D301

AUTHORS: Gaydukov, G.V., and Volkova, N.M.

TITLE: Production of cast vanadium

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Sibirskoye otdeleniye, no. 2, 1961, 43-49

TEXT: In the production of ductile vanadium, the competing processes consist of reducing vanadium trichloride with magnesium, V_2O_5 and V_2O_3 with calcium as cited by U. Rostoker (Ref. 1: Metallurgiya vanadiya (Metallurgy of Vanadium), pod red. Ye.M. Savitskogo, IL, M, 1959) and V_2O_3 with carbon in vacuo as cited by A.Yu. Polyakov (Ref. 2: Osnovy metallurgii vanadiya (Principles of Vanadium Metallurgy), Metallurgizdat, M. 1959). One of the principal drawbacks of these methods is that vanadium is obtained in powder form, in granules of various sizes and in sponge form (by the last

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method) and conversion of these into compact metal requires long heat treatment or high melting in vacuo. The advantage of thermal calcium reduction of vanadium oxides is that it cuts down subse-- quent steps and being an exothermic reaction it provides most of the heat required. The process was investigated and perfected by Marden and Rich [Abstractor's note: Names taken from Russian], who, in order to increase the solubility of slag, added to it 1 mole of $CaCl_2$ per every mole of CaO formed. R. McKechnie and A.U. Seybolt (Ref. 3: Preparation of ductile vanadium by calcium reduction. J. Chem. Soc. 97, 311, 1950) by means of iodine addition kept the reduction temperature at the melting point of vanadium. The extraction was 74 % and metal purity 99.5 %. The process is uneconomical and of poor efficiency. H.A. Wilhelm and I.R. Long (Ref. 4: Am. Pat. 2700606, 1955) solved the problem by using a comparatively inexpensive sulphur instead of iodine. The authors point out that they have already used calcium sulphide thermit method for reducing titanium, niobium and vanadium oxides. The present report deals

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with the use of this method for producing cast vanadium. From consideration of the free energy changes for reducing vanadium oxides to vanadium, an effective reducing agent -- for instance metallic calcium -- is needed. Fig. 1 shows the change in free energy for the reduction reaction of vanadium oxides. In contrast to carbon, aluminum and silicon, metallic calcium is not soluble in liquid or solid vanadium and the reduction process is, therefore, carried out at higher pressures, under which partial pressure of calcium vapour is appreciable. The presence of oxygen greater than 0.07 %, sulphur 0.010 % and nitrogen 0.03 % in metallic vanadium greatly reduces its malleability, while the metal with low concentration of these impurities is quite malleable (Vickers Hardness less than 150 units). Nitrogen is the principal impurity and this should be removed, and since both metallic calcium and V_2O_5 contain nitrogen, steps must be taken for its removal. To do this calcium is distilled in vacuo (10^{-3} mm at 865-900°C) as quoted by W.J. McCreary (Ref. 6: High Purity Calcium, J. Metals, 10, 9. 615, 1958) while

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V_2O_5 is partially reduced with hydrogen at 900°C for 3 hours to V_2O_3 with subsequent vacuum treatment at 450-500°C at $5 \cdot 10^{-3}$ mm to remove moisture and absorbed hydrogen. Hence, the reagents were of the following purity: V_2O_3: V - 63.98-66.45 %; Ti - <0.1 %; Fe, Mg, Ni, Ca, Cu, all 0.1 %; N ≤ 0.003 %; H ≥ 0.008 %; Al < 0.01 %; Si < 0.08 %. Ca: C - 0.003 %; Mg - 0.005 %; Fe - 0.003 %; N_2 - 0.003 %; O_2 - 0.015 %. The powder S was obtained by the thermit method. The reagents in proportion V_2O_3 : S : Ca = 10 : 3 : 19 were compressed into briquettes (40 x 30 mm) using a pressure of 1200-2400 kg/cm^2. The charge of 1600-3200 g was placed in a molybdenum reactor inside the steel casing. The reactor was fitted with a dropping funnel and the base of the casing was made of a water cooled copper plate. The whole apparatus was evacuated to 10^{-3} mm and then filled with purified argon to 1.1 - 1.25 atm. Initial heating to 300-320°C was done to start exothermic reaction of S and Ca. The overall heat of reduction reaction brought the fumace

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to 2500°C. The final pressure increased to 8-12 atm. The product of vanadium ingot and slag was crushed and leached with water and 10 % HCl sol. to separate them. The effect of briquetting and the size of charge on metal yield is given in Tables 2 and 3. From the data in Tables 2 and 3 it may be seen that the reduction process is governed largely by the specific heat effect and general equation: $V_2O_3 + 13\ Ca = 2\ V + 3\ CaO + Q$. The excess of Ca required is 60 % of the theoretically needed quantity, and sulphur, 1.5 mole per mole of V_2O_3. In conclusion the authors state that the technology of production of metallic vanadium in the form of ingot has been proposed. The vanadium ingot obtained with the composition V - 98.7 %, O2 - 0.21 %, $N_2 < 0.035$ %, $S < 0.05$ %, shows an increase in hardness. In order to obtain malleable vanadium required for cold working of metal, further investigation is required, possibly with the use of purer reagents. There are 4 figures, 3 tables and 7 references: 3 Soviet-bloc and 4 non-Soviet-bloc. The

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Production of cast vanadium

references to the three English-language publications read as follows: R. McKechnie, A.V. Seybolt, Preparation of ductile Vanadium by calcium reduction, J. Electrochem. Soc. 97, 311, 1950; H.A. Wilhelm, I.R. Long, Am.pat. 2700606, 1955; W.J. McCreary, High-purity calcium J. of Metals, 10, 9, 615, 1958.

ASSOCIATION: Ural'skiy filial AN SSSR, Sverdlovsk (Ural Branch. AS USSR. Sverdlovsk)

SUBMITTED: May 25, 1960

Card 6/10

GAYDUKOV, G.Y.; GAYDUK, V.G.

Production of plastic vacuum. Izv. Sib. otd. AN SSSR no.7: 29-36 '62 (MIRA 17:8)

1. Ural'skiy filial AN SSSR, Sverdlovsk.

ACCESSION NR: AP4015113 S/0136/64/000/002/0082/0083

AUTHORS: Gaydukov, G.V.; Shveykin, G.P.; Alyamovskiy, S.I.

TITLE: Reducing the waste products of niobium-tungsten alloy

SOURCE: Tsvetny*ye metally*, no. 2, 1964, 82-83

TOPIC TAGS: niobium, niobium alloy , arc smelting, shavings, vacuum treatment, sodium fluoride, selective solvent, nitric acid, ferroniobium, permanent electrode, tungsten electrode, lattice spacing, hydration method

ABSTRACT: The waste products remaining after the mechanical processing of niobium and its alloys, such as shavings, chips, etc., can be reduced by the hydration method followed by sintering. But the resulting metal is porous and requires further smelting. This investigation, therefore, deals with the possibility of purifying the waste products of niobium-tungsten alloys by chemical methods to producing specified-quality ingots by way of arc smelting and thermal treatment of the alloys in a vacuum. It appears that a pre-

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ACCESSION NR: AP4015113

liminary chemical processing of the waste products makes it possible to eliminate the oxidized layer of shavings as well as the possible mechanical impurities. A study of the relationship between the shavings' dissolving speed and time at a temperature of 60 C revealed that the initial dissolving speed is the fastest for the shavings containing a large quantity of impurities, but after the first 5-6 minutes it is reduced to below the dissolving speed of similar shavings containing a large quantity of the oxide phase. The physico-chemical properties (hardness, plasticity, microstructure and lattice spacing) of the alloys made from the shavings processed by chemical or vacuum methods were proved to correspond to the properties of standard alloys. Orig. art. has: 1 table.

ASSOCIATION: None

SUBMITTED: 00 DATE ACQ: 12Mar64 ENCL: 00

SUB CODE: ML, CH NO REF SOV: 001 OTHER: 000

Card 2/2

GAYDUKOV, I.I. (Tula)

Accuracy of answers and completeness of solutions to geometry problems. Mat. v shkole no.2:32-43 Mr-Ap '59.
(MIRA 12:6)

(Geometry--Problems, exercises, etc.)

KEPERSHA, L.M.; GAYDUKOV, I.M.; BOVIN, Ye.I.; DENISOVA, V.P.; PANOV, A.M.; SHVETS, G.I.

Rubber coating of metal-cord cloth in a cord calender unit. Kauch. i rez. 24 no.8:29-33 '65. (MIRA 18:10)

1. Nauchno-issledovatel'skiy institut shinnoy promyshlennosti i Omskiy shinnyy zavod.

GAYDUKOV, K.A.; KOKOTKO, A.I.; TUMANOVA, Z.S.

Effect of the conditions of drying of viscose silk on the sorption of dyestuffs. Khim.volok no.4:41-44 '62. (MIRA 15:8)

1. Kiyevskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta iskusstvennogo volokna.
(Dyes and dyeing--Rayon)

SHIMKO, I.G.; KUVIN, A.A.; VOYTSEKHOVSKAYA, Ye.S.; TATEVOSYAN, Ye.L.; MAKAROVA, T.P.; GAYDUKOV, K.A.; GINZBERG, M.A.; Prinimali uchastiye: POLYAKOVA, G.V.; BEZVERSHENKO, V.I.

Introducing continuous mercerization systems in the manufacture of viscose rayon. Khim. volok. no.3:61-65 '63. (MIRA 16:7)

1. Kiyevskiy kombinat (for Shimko, Kuvin, Voytsekhovskaya). 2. Leningradskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta iskusstvennogo volokna (for Tatevosyan, Makarova). 3. Kiyevskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta iskusstvennogo volokna (for Gaydukov, Polyakova, Bezvershenko). 4. Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna (for Ginzberg).
(Rayon) (Mercerization)

12 1225

S/126/60/009/01/027/031
E021/E191

AUTHORS: Gaydukov, L.G., Novogrudskiy, V.N. and Fakidov, I.G.

TITLE: The Problem of the Phase Composition of the Chromium-Tellurium System. (Letter to the Editor.

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 1, pp 152-154 (USSR)

ABSTRACT: X-ray and magnetic measurements have been carried out by Haraldsen but still insufficient work has been done on the Cr-Te system. Therefore further electrical and magnetic measurements were made. Alloys containing 5 to 95 atomic % Te were prepared from Cr and Te powders. Alloys containing up to 50% atomic % Te were heat-treated at 700 °C and those with more than 50% at 500 °C for 50 hours. All the prepared alloys were ferromagnetic at the temperature of liquid nitrogen. The temperature dependence of the electrical resistance of the alloys was studied, from which the Curie temperature was found. This was checked by the effect of temperature on the magnetic properties. Metallographic examination showed that the region of solid solution, if it exists, is in the region

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84385

24.7900 (1035, 1144, 1160)

S/056/60/039/004/003/048
B004/B070

AUTHORS: Gaydukov, L. G., Grazhdankina, N. P., Fakidov, I. G.

TITLE: Investigation of the Temperature Dependence of Spontaneous Magnetization of Chromium Telluride

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 4(10), pp. 917-922

TEXT: The aim of the authors was to find out whether chromium telluride is ferromagnetic or ferrimagnetic. For this purpose, the temperature dependence of the spontaneous magnetization σ_s was investigated in the neighborhood of the Curie point. The chromium telluride was prepared by melting together powders of chromium and tellurium. Fig. 1 shows the magnetocaloric effect ΔT as a function of σ^2. σ_s^2 was obtained by extrapolating to T = 0. Fig. 2 shows $H_i/\sigma = f(\sigma^2)$. $\sigma_s^2 = -\alpha/\beta$ was obtained from $\alpha\sigma + \beta\sigma^3 = H$ (1), and was found to be in good agreement with the experimental data. In the temperature range $|T - \theta_f| \leqslant 14.5^\circ C$, α is a

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Investigation of the Temperature Dependence of Spontaneous Magnetization of Chromium Telluride

S/056/60/039/004/003/048
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linear function of temperature: $d\alpha/dT = 40$, while β remains almost constant and lies between 1 and 0.8. The Curie temperature determined from the condition $\alpha = 0$ is 60°C; this is somewhat higher than that determined from the magnetocaloric effect (55°C), from the temperature dependence of the electrical resistance (57.5°C), and from the maximum of the galvanomagnetic effect (58.0°C). σ_s obtained by the three methods are compared in Fig. 3. The results agree well with each other in the range $T < \theta_f$. The rate of change of the spontaneous polarization of CrTe brought about by temperature was determined from equation (2): $(\sigma_s/\sigma_o)^2 = \{(1 - T/\theta_f) \cdot \{$ was found to be 2.40 - 2.46 (Fig. 4). In the paramagnetic region, the magnetic susceptibility obeys the Curie - Weiss law $\chi = C_M(T - \theta)$, where $C_M = 1.97$, and $\theta = 347°K$. The authors interpret the results by means of the s - d exchange model of ferromagnetism. Pending a final decision by means of a neutronographic investigation, the authors come to the conclusion that CrTe is not ferrimagnetic but ferromagnetic which is characterized by weak s - d exchange interaction.

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Investigation of the Temperature Dependence of Spontaneous Magnetization of Chromium Telluride

S/056/60/039/004/003/048
B004/B070

Among others, the authors mention V. P. Krasovskiy, K. P. Belov, A. Z. Men'shikov, S. A. Nemnonov, S. V. Vonsovskiy, A. K. Kikoin, and K. B. Vlasov. There are 4 figures and 17 references: 8 Soviet, 2 US, 1 Canadian, 4 French, 1 German, and 1 Japanese.

ASSOCIATION: Institut fiziki metallov Akademii nauk SSSR (Institute of the Physics of Metals, Academy of Sciences, USSR).
Sverdlovskiy gosudarstvennyy pedagogicheskiy institut (Sverdlovsk State Pedagogical Institute)

SUBMITTED: April 27, 1960

Card 3/3

20453

24.7600 1043, 1158, 1164 also 1413, 1045 S/056/61/040/002/006/047
B113/B214

AUTHORS: Grazhdankina, N. P., Gaydukov, L. G., Rodionov, K. P., Oleynik, M. I., Shchipanov, V. A.

TITLE: Effect of pressure on the electrical resistance and the galvanomagnetic effect in chromium telluride

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 40, no. 2, 1961, 433-440

TEXT: The temperature dependence of the electrical resistance and the isothermal lines of the galvanomagnetic effect $r = \Delta R/R$ were measured in the temperature range of magnetic transformation at a pressure of 4600 kg/cm^2. A high-pressure chamber of austenitic steel was used for the measurement. The object to be observed was placed in the lower part of the chamber which was situated between the poles of an electro-magnet. There were five electric leads in the upper part of the chamber. One of these was used for measuring the electrical resistance of a Manganin manometer. The other four leads were used for the measurement of the electrical resistance of the preparation and the measurement of

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Effect of pressure on the...

temperature. The hydrostatic pressure in the chamber was produced by means of a high-pressure compressor according to the system of L. F. Vereshchagin. Measurements showed that the electrical resistance of chromium telluride increased with the pressure; no hysteresis effect was observed. In the pressure range used $R_T^{-1}dR/dp$ was equal to $(1\div1.5)10^{-4}kg^{-1}cm^2$. On the basis of this, it was assumed that a compression on all sides must lead to a shift of the Curie point of chromium telluride toward lower temperatures. However, this effect must be sufficiently large. Direct measurements of the temperature dependence of the electrical resistance at atmospheric pressure and a pressure of 4600 kg/cm^2 gave for the Curie point the values 58°C and 31°C, respectively. The following formula holds for the change of the Curie point $d\theta_f/dp$ of chromium telluride caused by a change in the pressure on all sides: $d\theta_f/dp = (-5.9\pm0.3)\cdot10^{-3}deg.kg^{-1}cm^2$ (1). This was checked by a measurement of the galvanomagnetic effect $r = \Delta R/R$ at high pressure. In this case, $d\theta_f/dp$ was determined for a pressure of

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4600 kg/cm^2 and a field of 8000 oe from the shift of the maximum of the galvanomagnetic effect. It was found that $d\theta_f/dp = -6.2 \cdot 10^{-3}$ deg·kg^{-1}·cm^2. By means of the compressibility $\varkappa = (22 \pm 3) \cdot 10^{-7}$ cm^{2}kg, $d\theta_f/dV$ was determined to be $3.2 \cdot 10^{25}$ deg·cm^{-3}. The change of Curie temperature is related to the reduction in the interatomic distance on account of the substitution of tellurium atoms by selenium ($CrTe_{1-x}Se_x$). In order to obtain exact results on the temperature of magnetic transformation of the alloy $CrTe_{1-x}Se_x$, and on the dependence of its change on the volume of the unit cell, three different methods were used for the determination of θ_f. First, it was determined from the bend of the R(T) curves; secondly, from the maximum of the galvanomagnetic effect; and thirdly, from the vanishing of spontaneous magnetization, determined by the method of "thermodynamic coefficients" ($T = \theta_f$ for $\alpha = 0$). Always the same value was obtained for $d\theta_f/dV$, which showed that the integral of volume interaction in the

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system Cr-Te is proportional to the decrease of the volume of the unit cell. The dimensions of the unit cell were determined by X-ray analysis. It was possible to obtain the law of the dependence of the galvanomagnetic effect on the magnetic field strength at the Curie point by using the theory of thermodynamics. It was found that for chromium telluride and $CrTe_{0.93}Se_{0.07}$, $r \sim H^{2/3}$; for $T > \theta_f$ the authors obtained $r \sim H^2$. The dependence of the galvanomagnetic effect on the temperature in CrTe and in $CrTe_{0.93}Se_{0.07}$ at atmospheric pressure as well as at a pressure of 4600 kg/cm^2 was studied. It was found that for $T < \theta_f$ the pressure leads to an increase in the absolute value of the galvanomagnetic effect in CrTe, but for $T > \theta_f$ (in the paramagnetic range) the $r(T/\theta_f)$ curves for atmospheric pressure and for p = 4600 kg/cm^2 coincide. This shows that the change in the galvanomagnetic effect caused by pressure is related to the change in magnetization. In the range of investigation, the curves for $CrTe_{0.93}Se_{0.07}$ lie lower than

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those for CrTe. If it is assumed that c in the equation $a = c\beta^{-2/3}\sigma_0^{8/3}$ (4), in which c is given by $c = r_s/\sigma_s^2$ (σ_s - spontaneous magnetization), is not affected by pressure, the change in the spontaneous magnetization of CrTe caused by pressure may be considered to be due only to the change in the exchange integral for a constant value of the magnetic moment at absolute saturation. It can then be said that the observed increase of the intensity of the para process under pressure is related to the decrease of the thermodynamic coefficient β in Eq. (4).

I. G. Fakidov and S. D. Margolin are thanked for the magnetic measurements. Yu. A. Bazhin, N. S. Akulov, K. P. Belov, G. A. Zaytseva, Ye. I. Kondorskiy, and V. L. Sedov are mentioned. There are 6 figures, 2 tables, and 15 references: 7 Soviet-bloc and 8 non-Soviet-bloc.

ASSOCIATION: Institut fiziki metallov Akademii nauk SSSR
(Institute of the Physics of Metals of the Academy of Sciences USSR)

SUBMITTED: July 30, 1960

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APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520009-5"

[redacted], ...

Dissertation: "Effect of Plastic Deformation on the Transformation of Austenite to to Martensite." Cand Tech Sci, Ural' Polytechnic Institute, Sverdlovsk, 1953. (Referativnyy Zhurnal-Khimiya, No 12, Moscow, Jun 14/

SO: SOZ 318, 23 Dec 1954

GAYDUKOV, M.G.

/ Effect of the grain size of austenite on the martensite transformation in steel. M. G. Gaidukov and V. D. Sadovskii (Doklady Akad. Nauk SSSR, 1954, 96, 97–100). The martensite point in steels containing 12—13% Cr, ~1·5% Ni and ~0·8% C, is higher in those having a coarser austenite (produced by annealing at a higher temp.), and this was confirmed by producing a structure of heterogeneous grain size by repeated quenching from 1000°, followed by cooling in liquid N to promote the martensite transformation, which was more extensive in the regions of coarse grain size. R. C. MURRAY.

Institut fiziki metallov Ural'skogo filiala Akademii nauk SSSR.

GAYDUKOV, M.G.

SOV/137-58-8-17716

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 8, p 217 (USSR)

AUTHORS: Pavlov, V. A., Gaydukov, M. G., Grin', A. V., Pereturina, I. A.

TITLE: The Effect of Static Distortions of the Crystal Lattice on the Mechanical Properties of Alloys of Solid Solutions of Aluminum With Magnesium (Vliyaniye staticheskikh iskazheniy kristallicheskoy reshetki na mekhanicheskiye svoystva splavov α-tverdogo rastvora alyuminiya s magniyem)

PERIODICAL: V sb.: Issled. po zharoprochn. splavam. Vol 2. Moscow, AN SSSR, 1957, pp 257-265

ABSTRACT: Investigations performed dealt with the effect of static distortions of the crystal lattice on the mechanical properties of an α-solid solution of Al-Mg (0.01-2% Mg) the cohesive forces in which are independent of the concentration of the solid solution. In studying the relationship between E and the temperature, it was established that E and G do not depend of the concentration within a relatively wide range of temperatures, 20-700°C. The structure of alloys which had been deformed, as well as the processes occurring during deformation, were studied by means of investigation of the internal friction (IF)

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The Effect of Static Distortions of the Crystal Lattice (cont.)

within plastically deformed alloys. The IF was determined at torsional vibrations with a frequency of 1 cps. The IF graph for pure Al exhibits one maximum at approximately 250°, whereas the IF graphs of alloys show two maxima at 130° and at 250°. In the recrystallized state, the alloys exhibit one maximum at 300°, a condition indicative of relaxation along the grain boundaries. The maximum IF point, corresponding to 250° and situated in the region of recrystallization (R) temperatures, is governed by the viscous behavior of the slip lines. In the light of dislocation theory, this maximum is attributable to the dispersion of energy connected with the motion of dislocations (D) under the influence of external stresses. The IF maximum at 130° is attributable to the diffusion of Mg in alloys which have been deformed. As the concentration of Mg in the solid solution is increased, this maximum is displaced toward higher temperatures (up to 200°). The energy of activation of the diffusion of Mg throughout deformed alloys increases with increasing concentrations of Mg. In alloys which have been deformed and which exhibit static distortions, the additives are unevenly distributed throughout the volume, a condition which, as shown by experiments, significantly affects the kinetics of plastic deformation, recovery, and recrystallization. In the light of the dislocation theory, the increase in R temperature is explained by the formation of clouds of Mg atoms around the D's with resulting reduction

SOV/137-58-8-17716

The Effect of Static Distortions of the Crystal Lattice (cont.)

in the mobility of the latter. Bibliography: 18 references. See also RZhMet, 1958; Nr 3, abstract 5868.

L. G.

1. Aluminum-magnesium alloys--Mechanical properties
2. Crystals--Distortion 3. Crystals--Lattices

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GAYDUKOV, M. G.

USSR/Solid State Physics - Mechanical Properties of Crystals and Poly-Crystalline Compounds E-9

Abs Jour : Ref Zhur - Fizika, No 1, 1958, 1083

Author : Gaydukov, M.G., Pavlov, U.A.

Inst : Institute of Physics of Metals, Ural' Branch Academy of Sciences, USSR.

Title : Relaxation of Stresses in Alloys of Aluminum with Magnesium.

Orig Pub : Fiz. metallov i metallovedeniye, 1957, 4, No 1, 123-130

Abstract : An investigation was made of the relaxation of stresses in alloys of aluminum with magnesium at a temperature range from 100 to 300 C with initial stresses of 300 g/mm^2. It was established that there is an increases in the relaxation stability of Al-Mg alloys, compared with pure aluminum. The increase in the relaxation stability is

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GAYDUKOV, M.G.

with V. A. PAVLOV
"Investigation of Stress Relaxation in Iron-Chrome-Nickel Austenitic Alloys with Additions of Titanium and Niobium" p. 133

"Investigation of Creep in Iron-Chrome-Nickel Austenitic Alloys with Additions of Titanium, Niobium, and Tungsten" p. 140

Problems in the Theory of Heat Resistance of Metal Alloys, Moscow, Izd-vo AN SSSR, 1958, 160 pp. (Trudy, Inst. Fiz. Metal., Ural filial, AN SSSR)

The articles in this book constitute reports on extensive studies, conducted between 1949 and 1954 by the Inst. Physical Metallurgy Urals Branch AS USSR, and devoted to the development of a general theory of heat resistance.

GAYDUKOV, M. G.

129-4-1/12

AUTHORS: Gaydukov, M. G., Candidate of Technical Sciences, and Sadovskiy, V.D., Doctor of Technical Sciences, Prof.

TITLE: Influence of plastic deformation on martensitic transformation. (Vliyaniye plasticheskoy deformatsii na martensitnoye prevrashcheniye).

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, No.4, pp. 2-7 + 2 plates (USSR).

ABSTRACT: The experiments were carried out on austenitic steels produced in a high frequency furnace. Ingots weighing 8 kg were forged into quadratic rods of 14 x 14 mm. For obtaining the austenitic state, alloying was effected with Cr, Ni, Mn. The chemical analyses of the tested steels are entered in Table 1. For investigating the stability of the austenite against martensite transformation due to the effect of plastic deformation square specimens of 10 x 10 x 70 mm were produced. The specimens were heated in a salt bath to 1150°C and quenched in oil and, following that, the decarburised layer was ground off. The plastic deformation was effected with hand operated rolls for rolling square profiles. The degree of austenite into martensite transformation during the deformation was determined by

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the magnetometric method. The location of the martensitic points and the intensity of transformation of austenite into martensite during cooling were also investigated by the magnetometric method; the specimens were of 3 mm dia and 50 mm long. The cooling speed to the temperature of liquid nitrogen was 5°C/min except for particular cases in which the cooling speed was lower still. The following conclusions are arrived at:

1. The stability of alloyed austenite in the case of plastic deformation is determined fundamentally by the relative positions of the martensitic point and of the deformation temperature. The intensity of transformation will be the smaller the larger the difference between the temperature of the martensitic point and the temperature of plastic deformation. In some alloy steels with a low martensitic point, the martensite will not form at all if the deformation is effected at room temperature or at higher temperatures.

2. In addition to the basic temperature dependence, the stability of alloyed austenite as regards plastic deformation is also determined by the chemical composition

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of the steel. For steels with equal martensitic transformation temperatures, those alloyed with Ni and Cr will be more stable than those alloyed with Ni and Mn.

3. Preliminary plastic deformation of austenite reduces the martensitic point and changes the kinetics of martensitic transformation during subsequent cooling. Lowering of the martensitic point takes place not only when there is a partial transformation of austenite into martensite during deformation but also in absence of martensite transformation and only as a result of plastic deformation. Lowering of the martensitic point after preliminary plastic deformation is characteristic not only for steels but also for carbon free iron alloys.

4. The state of phase hardening occurring as a result of reversible transformation of the α-phase into the γ-phase during heating of the carbon free alloy iron-nickel-manganese leads to a reduction of the martensitic point during subsequent cooling and to a change in the kinetics of martensitic transformation. Influence of the phase hardening on the kinetics of martensite transformation during cooling is similar to

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the influence of external plastic deformation.
5. The position of the martensitic point depends on the grain size of the austenite, particularly in Cr-Ni steels which are subjected to martensitic transformation in the range of sub-zero temperatures.
There are 11 figures, 2 tables and 7 references - 5 Russian, 1 German, 1 English.

ASSOCIATION: Ural Branch of the Ac.Sc. USSR (Ural'skiy Filial AN SSSR).

AVAILABLE: Library of Congress.

Card 4/4

129-58-5-2/17

AUTHORS: Gaydukov, M.G., Candidate of Technical Sciences and Sadovskiy, V.D., Doctor of Technical Sciences, Professor.

TITLE: Changes in the Hardening Coefficient Connected With the Development of Martensitic Transformation During Plastic Deformation (Izmeneniye koeffitsiyenta uprochneniya, svyazannoye s razvitiyem martensitnogo prevrashcheniya pri plasticheskoy deformatsii)

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, Nr 5, pp 4-8 (USSR)

ABSTRACT: In a number of austenitic steels plastic deformation at temperatures approaching the martensitic point brings about transformation of the austenite into martensite and, therefore, after the usual decrease in the hardening coefficient, a gradual increase of this coefficient will take place. The authors of this paper investigated the particular case of hardening of austenitic steels in which the deformation is accompanied by a transformation of the austenite into martensite. In addition to austenitic steels, a carbon-free alloy of iron with nickel was also tested. Rods of the tested alloys (the compositions of which are entered in a Table, p 4) were hardened from 1200°C and from these, specimens of

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3 mm dia, 30 mm rated length were produced by machining. For investigating the influence of preliminary plastic deformation, square blanks were used which were produced by rolling with various reductions. From these blanks specimens were produced for tensile tests which were carried out on a test machine (IM-4R) with automatic recording of the diagrams. From the obtained results the diagrams of the real stresses were plotted and the hardening coefficients were calculated for various degrees of deformation of each specimen starting from 5%. In Fig.1 the change of the coefficient of hardening during tension is graphed for nickel steels. In Fig.2 the influence of preliminary deformation and of the quantity of martensite on the change of the coefficient of hardening during tensile tests is graphed for the steel 25N24M2. In Fig.3 the influence is graphed of the preliminary deformation on the changes of the shape of the load vs. elongation curve of the alloy N29 (the respective compositions are entered in the Table, p 4). On the basis of the obtained results, it is concluded that the character of the change of the hardening

Changes in the Hardening Coefficient Connected with the Development of Martensitic Transformation During Plastic Deformation

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coefficient during deformation of austenitic steels is directly associated with the difference in the stability of the austenite with respect to martensitic transformation. Formation of martensite during plastic deformation leads to an increase in the hardening coefficient. Some of the features of the stretching of austenitic steels (change in the load, presence of two maxima) characterise the mutual relation between the processes of plastic flow and the martensitic transformation.
There are 3 figures, 1 table and 14 references, 10 of which are Soviet, 3 German and 1 English.

ASSOCIATION: Ural'skiy filial AN SSSR (Ural Branch of the AS USSR)

AVAILABLE: Library of Congress.

Card 3/3 1. Steel-Transformations 2. Austenitic steel-Deformation

AUTHORS: Gaydukov, M. G. and Pavlov, V. A. SOV/126-6-3-19/32

TITLE: Stress Relaxation in Alloys of Nickel with Copper (Relaksatsiya napryazheniy v splavakh nikelya s med'yu)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1958, Vol 6, Nr 3, pp 517-521 (USSR)

ABSTRACT: In earlier work (Refs 6 and 7) investigations were described of aluminium-magnesium alloys in which the interatomic bond forces did not depend on the concentration of the solid solution and the static distortions of the crystal lattice increased with increasing magnesium content. Increases in the yield point, the ultimate strength and the relaxation stability were observed in such alloys (Refs 1 and 2). Furthermore, diffusion processes of magnesium redistribution inside the volume of the solid solution were observed under load, which brought about a non-monotonous change of the mechanical properties as a function of the temperature and the deformation speed. Such diffusion processes brought about a non-uniform distribution of the magnesium along the volume of the solid solution; this was accompanied by a complication of the elementary act of diffusion and an increase in the

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recrystallisation temperature which in turn impeded the development of diffusion plasticity. In nickel-copper alloys there is an intensive drop in the characteristic temperature and the modulus of elasticity decreases (Refs.4 and 5). The static distortions of the crystal lattice are considerable at room temperature but they decrease rapidly with increasing temperature. In copper-rich deformed alloys an increase of the inter-atomic bond forces was observed which is probably due to the non-uniform distribution of the atoms in the volume of the solid solution, caused by diffusion during deformation and holding of the specimens at room temperature after deformation; in these alloys the formation during annealing of the K-state is possible, which is characterised by a non-uniform distribution of atoms of copper in the solid solution (Refs.8,9). Taking into consideration the properties of the nickel-copper alloys, it can be anticipated that intensive diffusion processes take place under load which are accompanied by intensive stress relaxation. However, diffusion during

 stress relaxation will bring about a non-uniform

Stress Relaxation in Alloys of Nickel with Copper

distribution of the atoms along the volume of the solid solution accompanied by formation of complexes of atoms and this will result in a decrease in the intensity of the relaxation processes. In the here described work the stress relaxation was studied in pure nickel and in nickel-copper alloys containing 10, 20, 40 and 60% Cu which were produced in high frequency vacuum furnace from electrolytic nickel and electrolytic copper with a content of admixtures not exceeding 0.05%, of which 0.02% was oxygen. The material for the specimens was first smelted in vacuum for the purpose of degasifying, then it was forged into rods of 14 x 14 mm cross section from which specimens with a test length of 100 mm and a dia. of 6 mm were produced. The specimens were annealed at specially selected temperatures so as to obtain for all the alloys an equal grain size. The stress relaxation was studied on machines designed by the Ural Branch of the Ac.Sc., providing for an automatic recording of the stress relaxation diagrams. The experiments were effected at 500, 550, 600 and 650°C with initial stresses of 2 and 4 kg/mm^2. In the first case the stress was many times less

Stress Relaxation in Alloys of Nickel with Copper

than the yield point of the alloys at the test temperatures and, therefore, the stress relaxation in these was predominantly by diffusion; in the second case the initial stresses were near to the yield point and stress relaxation could proceed also by sliding deformation. The yield point values for the tested alloys at the temperatures 500, 550, 600 and 650°C are entered in Table 1. The dependence of stress relaxation for an initial stress of 2 kg/mm^2, on the concentration of the solid solution is given in four graphs, Fig.1, expressed in relative values of the ratio - current stress/initial stress, σ/σ_0; each curve represents the stress relaxation for a certain time after the beginning of the tests. In Fig.2 the dependence is graphed of the stress relaxation on the concentration of the solid solution at 500°C and an initial stress of 4 kg/mm^2; the strongest proved to be the alloy containing 40% Cu and the fact is worth noting that, as regards the relaxation stability, the alloys can be ordered in the same sequence as for the yield point values. The following conclusions are arrived at: depending on the initial value of

Card 4/6 the stress, the stress relaxation can be predominantly due

Stress Relaxation in Alloys of Nickel with Copper

to sliding deformations or diffusional; if the stress relaxation is predominantly due to the sliding mechanism, those alloys are most stable which have the highest copper content; in the case that the diffusion mechanism is predominant, stress relaxation will be the more pronounced the higher the concentration of admixtures; in the case of diffusion under load, non-uniform distribution of the admixtures in the volume of the solid solution will take place, which is accompanied by work hardening of the copper-rich alloys (40 to 60% Cu) during the process of relaxation. In an appendix, the work of Kester and Schulle, Zs. Metallkunde, 1957, 48, 592 is quoted; these authors found that there was a change in the properties of the nickel alloy containing 55% Cu after annealing in the temperature range below 650°C which is attributed to the occurrence of near-ordering in this temperature range. It is stated that these data confirm the assumption of the authors of this paper of the possibility of hardening of the alloy during stress

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Stress Relaxation in Alloys of Nickel with Copper

relaxation as a result of near-ordering.
There are 2 figures, 1 table and 10 references, 8 of which are Soviet, 1 English, 1 German.

ASSOCIATION: Institut fiziki metallov Ural'skogo filiala AN SSSR (Institute of Metal Physics, Ural Branch of the Ac.Sc., USSR)

SUBMITTED: July 26, 1957

1. Copper-nickel alloys--Physical properties 2. Copper-nickel alloys --Diffusion 3. Copper-nickel alloys--Stresses 4. Copper-nickel alloys--Temperature factors

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GAYDUKOV, M.G.; PAVLOV, V.A.

Investigation of stress relaxation in iron-chromium-nickel austenitic alloys with titanium and niobium additions. Trudy Inst.fiz.met.UFAN SSSR no.19:133-139 '58. (MIRA 12:2)
(Iron-chromium-nickel alloys--Testing) (Deformations (Mechanics))

GAYDUKOV, M.G.; PAVLOV, V.A.

Investigating creep in iron-chromium-nickel austenitic alloys with additions of titanium, niobium and tungsten. Trudy Inst. fiz.met.UFAN SSSR no.19:140-148 '58. (MIRA 12:2)
(Iron-chromium-nickel alloys---Testing) (Creep of metals)

Gaydukov, M.G.

24(6) PHASE I BOOK EXPLOITATION SOV/2385

Akademiya nauk SSSR

Nekotoryye problemy prochnosti tverdogo tela; sbornik statey (Some Problems in the Strength of Solids; Collection of Articles) Moscow, Izd-vo AN SSSR, 1959. 386 p. Errata slip inserted. 2,000 copies printed.

Ed. of Publishing House: V. I. Aver'yanov; Tech. Ed.: R. S. Pevzner; Editorial Board: A.F. Ioffe, Academician; G. V. Kurdyumov, Academician; S. N. Zhurkov, Corresponding Member, USSR Academy of Sciences; B. P. Konstantinov, Corresponding Member, USSR Academy of Sciences; F. F. Vitman, Doctor of Physical and Mathematical Sciences, Professor (Resp. Ed.); L. A. Glikman, Doctor of Technical Sciences, Professor; N. A. Zlatin, Doctor of Physical and Mathematical Sciences; V. A. Stepanov, Doctor of Technical Sciences; Ya.B. Fridman, Doctor of Technical Sciences, Professor; B. S. Ioffe, Candidate of Technical Sciences (Deputy Resp. Ed.).

PURPOSE: This book is intended for construction engineers, technologists, physicists and other persons interested in the strength of materials.

COVERAGE: This collection of articles was compiled by the Otdeleniye fiziko-matematicheskikh nauk AN SSSR (Department of Physical and Mathematical Sciences) and the Fiziko-tekhnicheskiy institut AN SSSR (Institute of Applied Physics, Academy of Sciences, USSR) in commemoration of the 80th birthday of Nikolay Nikolayevich Davidenkov, Member of the Ukrainian Academy of Sciences, founder and head of the Otdel prochnosti materialov (Department of the Strength of Materials) at the Institute of Applied Physics, Academy of Sciences, USSR, founder of the Fakul'tet fizicheskogo metallovedeniya (Department of Physical Metallurgy) at the Leningradskiy politekhnicheskiy institut (Leningrad Polytechnic Institute), recipient of the Stalin Prize (1943), the Order of the Red Banner of Labor (1945) and the Order of Lenin (1953). The articles deal with the strength of materials, phenomena of imperfect elasticity, temper brittleness, hydrogen embrittlement, cold brittleness, influence of deformation speed on the mechanical properties of materials, fatigue of metals, and general problems of the strength, plasticity, and mechanical properties of nonmetals. Numerous personalities are mentioned in the introductory profile of Professor Davidenkov. References are given at the end of each article.

Gindin, I.A., B.G. Lazarev, Ya.D. Starodubov, and V.I. Khotkevich (Fiziko-tekhnicheskiy institut AN USSR-Institute of Applied Physics, Academy of Sciences Ukr. SSR, Khar'kov). Low-temperature Polymorphism of Metals 61

Zhurkov, S.N., and E.Ye. Tomashevskiy (Institute of Applied Physics, Academy of Sciences, USSR, Leningrad). Time Dependency of Strength Under Different Load Conditions 68

Bokshtayn, S.Z., T.I. Gudkova, A.A. Zhukhovitskiy, and S.T. Kishkin. Influence of Stresses and Deformation on the Process of Diffusion 76

Pines, B.Ya., and A.F. Sirenko (Gosudarstvennyy universitet imeni Gor'kogo, g. Khar'kov State University imeni Gor'kiy, Khar'kov). Diffusion Creep of Cermet Specimens Pressed From Powdered Iron 87

Syutkina, V.I., and E.S. Yakovleva (Institut fiziki metallov UFAN SSSR, Sverdlovsk-Institute of Metal Physics, Ural Branch, Academy of Sciences, USSR, Sverdlovsk). Influence of Aluminum and Copper on the Deformation of Nickel 95

Kontorova, T.A. (Institut poluprovodnikov AN SSSR, Leningrad-Semiconductor Institute, Academy of Sciences, USSR, Leningrad). Relationship Between the Mechanical and Thermal Characteristics of Crystals

Garber, R.I., and I.I. Soloshenko (Gosudarstvennyy pedagogicheskiy institut imeni G.S. Skovorody, Khar'kov-State Pedagogical Institute imeni G.S. Skovorda, Khar'kov). Strengthening of Rock Salt Crystals by Repeated Reverse Bending 105

Gaydukov, M.G., and V.A. Pavlov (Institute for Metal Physics, Ural Branch, Academy of Sciences, USSR, Sverdlovsk). Some Aspects of Stress Relaxation in Bronze BM_{tS} Z-1 111

Tsobkallo, S.O., and Z.A. Vashchenko (Polytechnic Institute imeni M.I. Kalinin, Leningrad). Increasing the Elastic Limit and Decreasing the Elastic Aftereffect During Cold Hardening and Tempering of Spring Aluminum Bronze BrA7 118

Glikman, L.A., and V.N. Kolgatin (NII po pererabotke nefti i polucheniyu iskusstvennogo zhidkogo topliva, g. Leningrad-Scientific Research Institute for Petroleum Refining and Production of Synthetic Liquid Fuels, Leningrad). Nature of the Physical Yield Point of Steel 130

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PAVLOV, V.A.; GAYDUKOV, M.G.; DATSKO, O.I.; MOSKOVA, N.I.; PERETURINA, I.A.

Effect of structural characteristics on metal behavior at high temperatures. Issl.po zharopr.splav. 4:26-35 '59.
(MIRA 13:5)
(Nickel-copper alloys--Metallography)

24(6), 18(7) SOV/126-7-2-14/39

AUTHORS: Gaydukov, M. G. and Pavlov, V. A.

TITLE: Dependence of Creep of Al-Mg Alloys on Temperature and Applied Stress (Zavisimost' polzuchesti splavov Al-Mg ot temperatury i velichiny prilozhennykh napryazheniy)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1959, Vol 7, Nr 2, pp 254-258 (USSR)

ABSTRACT: Alloys of Al (99.99% purity) and 0.12, 1.11 and 2.20% Mg were made in a high frequency furnace. The ingots were forged into rods, from which specimens were made, with a working part length of 50 mm, a diameter of 8 mm, and threaded ends. In order to ensure an equal grain size for all alloys (0.16 mm), the specimens were annealed at temperatures specially selected for each alloy in the temperature range 440-460°C. The temperature was kept constant automatically within ± 2°C, and was measured by two thermocouples attached to the specimen. The duration of testing was up to 200 hours. In Figs 1 and 2, creep curves for pure aluminium and an aluminium alloy containing 0.12% Mg are shown, from which it can be seen that alloying of Al with even a small quantity of Mg considerably increases its strength. The strength increases further with increase in Mg content. This can

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be seen from the creep curves of Fig 3. In Fig 4 the change in the logarithm of the creep rate with change in composition at 150-350°C and an acting stress of 2 kg/mm^2, is shown graphically. In Fig 5 curves for the change in the logarithm of the creep rate with concentration of the solid solution at 250-400°C at a stress of 0.3 kg/mm^2, are shown. Comparing the curves of Figs 4 and 5, it can be seen that as the deformation stress changes, the dependence of the strength of alloys on concentration changes considerably. From the above experiments the authors have arrived at the following conclusions:
1. As a result of alloying aluminium with magnesium, the greatest strengthening of alloys is observed when the plastic deformation mechanism is a shearing one.
2. At low deformation rates and relatively high temperatures, the effect of strengthening the alloys decreases considerably due to development of diffusion plastic deformation, which is associated with the diffusion of magnesium atoms under the action of heat and the deformation stresses applied.

SOV/126-7-2-14/39

Dependence of Creep of Al-Mg Alloys on Temperature and Applied Stress

There are 5 figures and 11 references, 7 of which are Soviet, 4 English.

ASSOCIATION: Institut fiziki metallov AN SSSR
(Institute of Metal Physics, Ac. Sc. USSR)

SUBMITTED: June 10, 1958

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SOV/126-8-3-16/33

AUTHORS: Gaydukov, M.G. and Pavlov, V.A.

TITLE: Dependence of Creep of Nickel-Copper Alloys on Solid Solution Concentration and Deformation Conditions

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 8, Nr 3, pp 426-433 (USSR)

ABSTRACT: The aim of the present investigations was to study the influence of change of concentration of nickel-copper alloys on their creep behaviour under conditions when plastic deformation occurs preferentially, either by slip or by a diffusion mechanism. Nickel-copper alloys were made at the Special Alloys Laboratory of the Institute of Metal Physics in a high frequency furnace under a vacuum of 10^{-5} mm Hg. Electrolytic nickel N0000 (99.99% Ni) and electrolytic copper with a total impurity content of less than 0.05% (among them 0.02% oxygen) were the starting materials. Nickel and copper were first re-melted in vacuum in order to remove gases. The ingots were forged into rods of 18 mm diameter, from which specimens with threaded heads were ground. The diameter of the working part of the specimens was 6 mm and the calculated length 50 mm. The specimens were

Dependence of Creep of Nickel-Copper Alloys on Solid Solution Concentration and Deformation Conditions

annealed at specially selected temperatures in the range 800 to 900°C in order to obtain approximately equal grain size in all alloys. Testing was carried out on TsKTI-2 machines. During testing, the temperature was kept constant within 2° and was measured by two thermocouples affixed to the specimen. The time of testing reached 500 hours in individual cases. In order to study the behaviour of alloys under conditions of deformation by slip and by diffusion, appropriate temperatures and deformation stresses were selected. In order to ensure a preferential plastic deformation by slip during creep, tests were carried out at relatively low temperatures and high deformation stresses. Preferential plastic deformation by diffusion could be ensured by using high temperatures and low stresses. The values of UTS of pure nickel and Ni-Cu alloys are shown in the table on p 428 (Ref 9). In Fig 1 to 3, curves are shown for the change in deformation, obtained at the moment of loading and after definite creep time intervals, with increase in alloy concentration for a temperature of 500°C and with

Dependence of Creep of Nickel-Copper Alloys on Solid Solution Concentration and Deformation Conditions

change in acting stresses (9, 2 and 5 kg/mm^2 respectively). Similar curves are obtained at 600°C at deformation stresses of 5 kg/mm^2 (Fig 4). From the results of testing of several specimens of each alloy under identical conditions (testing temperature and stress) the average deformation rates in the steady portion of the creep curves were calculated. In Fig 6 and 7, these results are plotted within the coordinates lg deformation rate - alloy composition, for temperatures of 500, 600 and 700°C and two deformation stresses. In Fig 8, the values of external stresses persisting after relaxation for 84 hours are plotted against two initial stresses σ_o (2 and 4 kg/mm^2 respectively). The authors arrive at the following conclusions: (1) The creep rate of Ni-Cu alloys in the temperature range 500 to 700°C depends on the composition of the alloy and the conditions of deformation. (2) At relatively low temperatures and high deformation stresses, commensurate with UTS, at which deformation most probably occurs preferentially by the slip mechanism, the creep

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Dependence of Creep of Nickel-Copper Alloys on Solid Solution Concentration and Deformation Conditions

rate is inversely dependent on the UTS. The higher the UTS, the lower the creep rate. Under these conditions of deformation, alloys containing 40% Cu possess the greatest strength. (3) At high temperatures and sufficiently low deformation stresses (stresses considerably lower than the UTS) diffusion processes occurring under the influence of stress play the decisive role. In this case the creep rate increases with increase in the concentration of the solid solution. (4) In a general case the behaviour of alloys under load is determined by the extent to which each of the two, plastic deformation by slip and that by diffusion, are involved. There are 8 figures, 1 table and 12 references, 8 of which are Soviet, 3 German and 1 French.

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of Metal Physics AS USSR)

SUBMITTED: August 2, 1958

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S/520/59/000/022/015/021
E021/E406

AUTHORS: Gaydukov, M.G. and Pavlov, V.A.

TITLE: The Creep of Alloys of Aluminium-Magnesium and Nickel-Copper Solid Solutions

PERIODICAL: Akademiya nauk SSSR. Ural'skiy filial, Sverdlovsk. Institut fiziki metallov. Trudy, No.22,1959,pp.107-112

TEXT: The behaviour of the alloys under conditions of slip and diffusion plastic deformation was studied. Creep tests were carried out on aluminium-magnesium alloys at 150 to 400°C with stresses of 2 and 0.3 kg/mm^2 and nickel-copper alloys at 500 to 700°C with stresses of 5 and 2 kg/mm^2. At the laboratoriya pretsizionnykh splavov Instituta fiziki metallov (Precision Alloys Laboratory of the Institute of Physics of Metals), aluminium-magnesium alloys were prepared in a high frequency furnace using 99.99% Al and containing 0.12, 1.11, 2.2% Mg. Nickel-copper alloys were prepared in a similar furnace in a vacuum using 99.99% Ni and 99.95% Cu. Alloys containing 10, 20, 40 and 60% copper were made. The specimens tested were 50 mm long and 8 mm diameter for the aluminium alloys and 6 mm for the nickel alloys. The time of testing in individual cases reached 500 h.

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The Creep of Alloys of ... S/520/59/000/022/015/021
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Typical graphs of elongation against magnesium content are shown in Fig.1 and 2. The relation between log. creep rate and magnesium content is shown in Fig.3 and 4. With a stress of 0.3 kg/mm^2, the increase in creep resistance by alloying is less marked than at a stress of 2 kg/mm^2. At high stresses and low temperatures when deformation can occur by a slip mechanism, the greatest creep resistance is shown by alloys with high magnesium content which possess high resistance to deformation. With increasing temperature and decreasing stress, the part played by diffusion processes increases. Plastic deformation on account of diffusion of magnesium atoms can occur. At 400°C and 0.3 kg/mm^2, the rate of creep is little different for alloys with high magnesium content than for pure aluminium. Fig.5 and 6 show the relation between elongation and concentration for nickel-copper alloys and Fig.7 and 8 the relation between log. creep rate and copper concentration. The alloys are similar to the aluminium-magnesium alloys. At high stresses and relatively low temperatures, the least creep rate is shown by alloys which have the greatest resistance to deformation (20 and 40% Cu) because slip is the mechanism of deformation. At low stresses and high

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temperatures the diffusion mechanism plays a more important part in deformation and the rate of creep increases with increase in alloying concentration. An increase in concentration of solid solution and a decrease in interatomic forces in these alloys is favourable for diffusion plastic deformation at high temperatures. There are 8 figures and 12 Soviet references.

GAYDUKOV, M.G.; PAVLOV, V.A.

Dependence of creep in nickel-copper alloys on the concentration of solid solutions and deformation conditions. Issl. po zharopr. splav, 6:64-70 '60. (MIRA 13:9)
(Creep of metals) (Nickel-copper alloys--Metallography

This collection of 45 articles deals with various problems in the production of heat-resistant alloys. Special attention is paid to the mechanisms of deformation of such metals as aluminum, copper, iron and nickel. Various defects and failures of metals are analyzed, and means of increasing the heat resistance and plasticity are discribed.

GAYDUKOV, M.G.

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D217/D303

18.1151

AUTHORS: Sadovskiy, V.D., Sokolkov, Ye.N., Lozinskiy, M.G., Petrova, S.N., Antipova, Ye.I., Gaydukov, M.G., and Mirmel'shteyn, V.A.

TITLE: Influence of thermo-mechanical treatment on the high temperature strength properties of austenitic steel

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Issledovaniya po zharoprochnym splavam, v. 7, 1961, 202-209

TEXT: A complex alloy steel of the austenitic class, widely used in industry for manufacturing components for high temperature service, was studied. During ageing of this steel, the complex chromium and vanadium carbides responsible for its strengthening are precipitated. The material was heated to 1180 - 1200°C and rolled at 1000 - 1100°C at a speed of 5.7 m/min. After rolling, the billets were immediately water quenched in order to prevent recrystallization. The cross-section of the billets obtained was 11.5 x 11.5 mm their length, 70 mm, and the reduction due to rolling, 25 - 30 %.

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Influence of thermo-mechanical ...

Control billets were heated simultaneously with those chosen for thermo-mechanical treatment, and were subsequently quenched from the above temperature. All billets, whether thermo-mechanically treated or only heated and quenched, were aged to a hardness of 310 - 320 H_B. After heat treatment, specimens for two series of tests were made from the billets. One series was used for studying structure during high temperature extension in vacuo. This also enabled the degree of deformation to be determined and photographs of the same portion to be taken at various stages of testing. Testing was carried out in a IMASh-5M machine at 900°C and a stress of 9.5 kg /mm^2, using specimens of 3 x 3 mm cross-section, heated by direct passage of current. The second series of tests, in which K.I. Terekhov participated, consisted of the standard tests for long-term strength at 650°C and stresses of 35 and 38 kg/mm^2, as well as at 700°C and a stress of 32 kg/mm^2. For this purpose, specimens of working portion diameter of 5 mm and 50 mm length were used. The microstructure of each specimen was studied in conjunction with these tests, particularly any peculiarities in structure appearing after thermo-mechanical treatment as compared with normal quenching.

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Influence of thermo-mechanical ...

The distribution of deformation along the length of the specimen, the intercrystalline and crystalline plasticity and the formation and propagation of cracks during fracture were given particular attention. It was found that high-temperature plastic deformation of the steel investigated, under conditions in which recrystallization processes are suppressed (thermo-mechanical treatment), leads to a considerable increase in long-term strength. The beneficial action of thermo-mechanical treatment is associated with structural characteristics of the steel which arise during high temperature plastic deformation and are fixed by cooling at a sufficiently high rate. Such characteristics are the complex geometry of grain boundaries, grain fragmentation and further refinement of the fine crystal structure. These structural characteristics of the steel retarded the development of fracture during creep, since (a) the characteristic serrated grain boundary structure retards the amalgamation between micro- and macro-cracks; (b) breaking-up of the fine crystal structure, and an increase in the density of immobilized dislocations render plastic deformation within the grains more difficult. There are 5 figures and 16 references: 15 Soviet-bloc and

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Influence of thermo-mechanical ...

1 non-Soviet-bloc. The reference to the English-language publication reads as follows: P.W. Davies and J.P. Dennison, J. Inst. Metals, 87, 4, 1958.

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Card 4/4

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18.8200 E193/E480

AUTHORS: Pavlov, V.A., Gaydukov, M.G., Noskova, N.I. Mel'nikova, V.V.

TITLE: The role of slip and diffusion in plastic deformation during creep of nickel-copper alloys

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.12, No.1, pp.97-107

TEXT: This paper was presented at the session of the Nauchnyy sovet po probleme prochnosti i plastichnosti tverdykh tel AN SSSR (Scientific Council on the Problems of Strength and Plasticity of Solids AS USSR) in June 1960.
Slip or diffusion constitute the two possible mechanisms of plastic deformation. No agreement has been reached regarding the mechanism of plastic deformation in creep. According to one school of thought represented by S.N.Zhurkov, the diffusion processes play no significant part in plastic deformation in creep, an opposite view being held by the other school of thought represented by B.Ya.Pines. Since both these opinions are based on experimental data, the most likely explanation of this apparent contradiction is that either mechanism can operate depending on the

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conditions of stress and temperature, and the object of the present investigation was to study the effect of these two factors on the mechanism of plastic deformation in creep of Ni-Cu alloys. The Ni-Cu system was chosen for this purpose because (a) an increase in the Cu content in Cu-Ni alloys brings about a decrease in the elastic modulus and the characteristic temperature of these alloys and an increase in the magnitude of the static distortions of the crystal lattice and (b) the activation energy for diffusion of copper in nickel is almost 1.5 times higher than that for self-diffusion of pure nickel, the former amounting to 35000 to 40000 cal/mol. These data indicate that the addition of Cu to Ni decreases the interatomic bond forces and, consequently, increases the intensity of the diffusion processes, even at relatively low temperatures. The vacuum-melted experimental alloys, containing 10, 20, 40 and 60% Ni, were prepared from 99.99% Ni and electrolytic copper containing less than 0.05% impurities. The ingots were forged into 18 mm diameter rods from which the test pieces, 6 mm in diameter and 50 mm (for creep tests) or 100 mm (for stress relaxation tests) long, were prepared.